

CLAIMS

1. A method of assessing a psychological or physiological state including the steps of:
 - 5 capture language cues that are indicative of the psychological or physiological state of a patient;
analyze the language cues to determine key features;
produce a data file containing data based upon the key features;
submit the data file to one or more pre-taught machine learning
 - 10 algorithms; and
combine output of the machine learning algorithms to determine the psychological or physiological state of the patient.
2. The method of claim 1 wherein the language cues are semantic cues.
- 15 3. The method of claim 1 wherein the language cues are visual cues.
4. The method of claim 2 wherein the semantic cues are obtained directly from text prepared by the patient.
5. The method of claim 2 wherein the semantic cues are obtained from speech that is converted to text.
- 20 6. The method of claim 3 wherein the visual cues include body language such as facial expression or other body movements.
7. The method of claim 1 wherein the step of analyzing the language cues includes the step of extracting key features from semantic cues by analyzing a text sample to determine a frequency of occurrence of words,
- 25 syllables, phonemes or other symbols.
8. The method of claim 1 wherein the step of analyzing language cues includes the step of extracting key features from visual cues by capturing a sequence of images or a video sample and analyzing the changes in areas of interest over time.

9. The method of claim 1 wherein the step of producing the data file further includes pre-processing steps and transformations of data.
10. The method of claim 9 wherein the pre-processing steps are selected from one or more of: exclusion of high frequency words; time
5 frequency/inverse document frequency calculations; normalization; and translation to a form required for the one or more machine learning algorithms.
11. The method of claim 1 wherein the machine learning algorithms are selected from one or more of: a support vector machine; a decision tree
10 learning algorithm; and a neural network.
12. The method of claim 1 further including the preliminary steps of teaching the machine learning algorithms by:
combining language cues with classes of psychological or physiological disorders and symptom severity derived from clinical trials and clinical
15 assessments to form the data file;
submitting the data file to the machine learning algorithms; and
translating the internal representation of the machine learning algorithms into symbolic rules.
13. The method of claim 12 wherein the pre-taught machine learning
20 algorithms are pre-taught by a learning method including analyzing language cues from patients known to have health problems and patients known not to have health problems.
14. The method of claim 12 further including the step of providing an expert-defined health related category for learning purposes.
- 25 15. The method of claim 12 further including the step of providing an expert-defined health related category for learning purposes wherein the expert-defined health related category is discrete.
16. The method of claim 12 further including the step of providing an expert-defined health related category for learning purposes wherein the

expert-defined health related category is a ranking on a given scale representing the severity of the health problem.

17. The method of claim 12 further including the step of extracting internal representations of the machine learning algorithms as categories
5 for psychiatric or physical conditions after machine learning has been completed.

18. A method of generating categories for psychological or physiological conditions including the steps of:
filtering a collection of expert descriptions of psychological or physiological
10 conditions with a stoplist;
for each expert description, constructing a list of frequently occurring descriptive terms;
forming an intersection of the lists of frequently occurring descriptive terms;
15 submitting the expert descriptions to one or more machine learning algorithms;
using the intersection as the targets for machine learning; and
extracting internal representations of the machine learning algorithms as categories for psychological or physiological conditions after machine
20 learning has been completed.

19. The method of claim 18 further including the step of expanding the list with synonyms of the frequently occurring descriptive terms.

20. The method of claim 18 wherein the expert descriptions are obtained from expert psychiatrists or other experienced health
25 practitioners.

21. An apparatus for diagnosing or assessing a psychological or physiological state of a patient comprising:
means for capturing language cues;
a processor programmed to analyze the language cues and compile a
30 data file;
one or more machine learning algorithms programmed in the processor

and producing an output from the data file;
means for combining the outputs to produce an indicator of psychological
or physiological state; and
display means adapted to display the psychological or physiological state
5 of the patient.

22. A method of extracting information from a corpus of documents
including the steps of:
analyzing the corpus of documents to extract information meeting
determined content criteria;
10 capturing language cues from the extracted information that are indicative
of the psychological state of an author of the extracted information;
analyzing the language cues to determine key features;
producing a data file containing data based upon the key features;
submitting the data file to one or more pre-taught machine learning
15 algorithms;
combining output of the machine learning algorithms to determine the
psychological state of the author; and
returning extracted information that meets a determined psychological
state.

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